

BUILDING ENERGY SIMULATION

*For Users of EnergyPlus, SPARK, DOE-2, BLAST, Genopt,
Building Design Advisor, ENERGY-10 and their Derivatives*

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EnergyPlus Wins R&D 100 Award

R&D Magazine recently announced that EnergyPlus is one of the winners of the 41st annual R&D 100 Awards, which honor the 100 most technologically significant new products of the year.



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ECOTECT and EnergyPlus

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ECOTECT is a software package with a unique approach to conceptual building design. It couples an intuitive 3-D design interface with a comprehensive set of performance analysis functions and interactive information displays. The latest version of ECOTECT contains quite a few new refinements for the export of building models to EnergyPlus (and Radiance, too). This means that you can work within an advanced modelling and visualisation interface, making use of a vast array of conceptual design tools, while still using EnergyPlus, the very best analysis and validation software.

Fundamentally, there are five main reasons to consider ECOTECT as part of your analysis workflow:

Modelling and Visualisation

As a conceptual design tool, ECOTECT provides its own fast and intuitive modelling interface for generating even the most complex building geometry. Most importantly however, the model is editable. Tasks such as resizing or inclining walls, manipulating complex curves, rearranging zones, moving apertures or even adding and deleting surfaces are all straightforward.

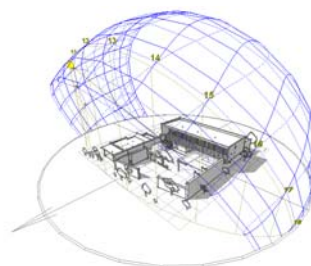
To assist in the design process, you can also visualize the model in OpenGL, overlaying Sun-path diagrams, shadow information, lighting grids or simply move the model around in real time. With its unique 'sketchiness' parameters, you can present analysis results directly within the context of the building model, safe in the knowledge that the client will understand that they are looking at preliminary ideas and not the finished product.

One central repository for all building data

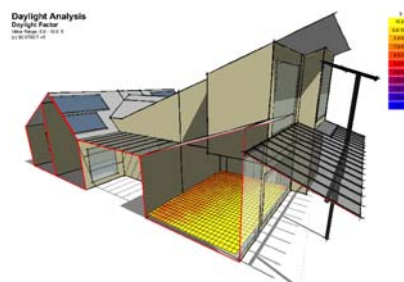
Each material in ECOTECT can store a wide range of information including basic thermal and surface properties, detailed layer descriptions, acoustic response and even cost and environmental impact data if it is available to you. Similarly, you can generate and assign complex annual operational schedules and hourly profiles for controlling occupancy, appliances or internal conditions.

Internal analysis functions

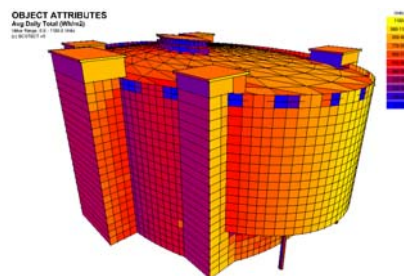
ECOTECT offers a wide range of internal analysis functions which can be used at any time while modelling. These provide almost instantaneous feedback on parameters such as sun penetration, potential solar gains, thermal performance, internal light levels, reverberation times and even fabric costs as you develop and refine the design. More importantly, you can also use generative functions as you design, allowing you to automatically shape shading devices given specific performance parameters or even interactively spraying acoustic rays to accurately position reflectors.



Overlaying a Sun-path on the model view.



Internal daylight factors shown over a standard working plane.



Annual cumulative solar radiation over the external surfaces.

These analysis functions enable ECOTECT to automatically calculate volumes and internal surface areas for each zone, as well as all aspects of shading and inter-zonal connectivity before you export the model.

Import and export capabilities

Once you have built the model, ECOTECT can export directly to a range of other analysis tools including EnergyPlus and Radiance. You can also export to DXF, VRML and even POV-Ray for more conventional rendering. This means that you can embed all the building data and design information into a single model file which can then be used as the basis for a whole suite of more focussed lighting and thermal analysis. Much of the data produced in these analyses can then be read back in and visualised within the context of the original ECOTECT model.

Combine these features with a powerful scripting engine for creating and editing building geometry, invoking analysis functions and analysing results, and you have the perfect tool for iteratively generating and optimising solutions for a range of design problems.

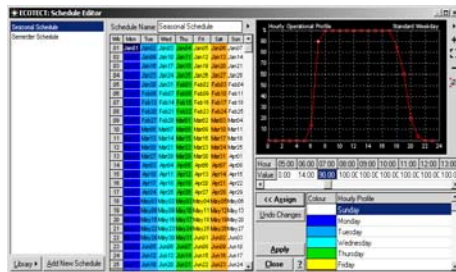
Working with EnergyPlus

While different analysis tools have different input requirements, there are many aspects of a building model that are common to all tools. Thus, if you are familiar with the generation of models for performance analysis in other programs, you will find it very quick to pick up the modelling process in ECOTECT.

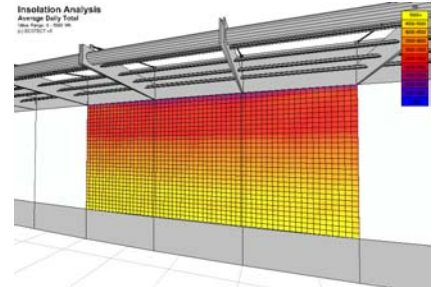
Obviously there will be some differences between what ECOTECT will let you model and what EnergyPlus will accept, such as the 4-node limitation on surfaces; however, these are all checked and explained whenever you export.

Future Development

Research work is ongoing on all aspects of the ECOTECT interface. Thus, if you have any suggestions or comments on how we can improve EnergyPlus support within the software, please let us know.



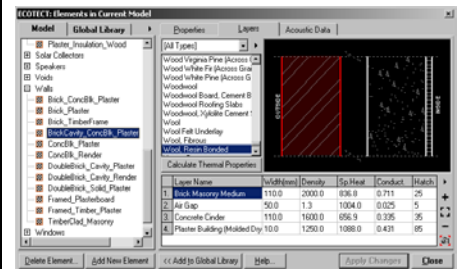
Working in EnergyPlus-mode when defining operational schedules.



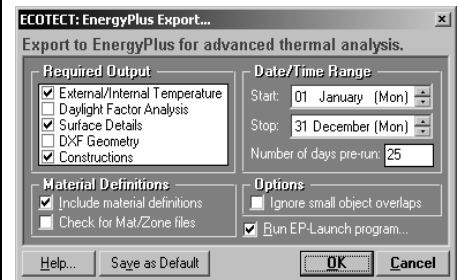
Analysing the effectiveness of a complex louvered shading device.



An example adobe house model generated for use in EnergyPlus.



An example material definition showing sectional layer information.



The export interface to EnergyPlus allows you to control output data.

You can download an evaluation version of ECOTECT at <http://www.squ1.com/> which is fully functional except for saving and printing.



EnergyPlus University Course Teaching Material



The teaching of building energy simulation is well established at the university level at many institutions around the world. Many instructors have expressed an interest in using EnergyPlus in their courses if there was information available to help them switch. The U.S. Department of Energy is pleased to announce the availability of university course material for teaching building simulation using EnergyPlus. This course material is targeted specifically to the university environment for teaching students about building simulation while introducing them to EnergyPlus.

The course comprises 25 complete PowerPoint lectures (over 800 total slides) which cover topics such as strategies for using energy simulation, expectations, building input, primary and secondary systems, and advanced features. While many of the lectures deal explicitly with how to model various components and systems with EnergyPlus, the lectures also provide an appropriate overview of building systems so that the students can understand the context and purpose of the technology within the building. The presentations include text, graphics, photographs, color-coded input, and other features designed to make teaching and understanding the concepts of building energy analysis easier. The course material also includes notes to instructors about assumptions made when developing the course as well as a course outline/schedule to help the instructor organize the semester and homework assignments and projects.

The course material is available free of charge from the EnergyPlus web site. Those who download the course are simply requested to share feedback, example problems, experiences, etc. with DOE so that other instructors can benefit--and so that we can notify you of new material and updates in the future.

To download the materials, go to <http://www.eere.energy.gov/buildings/energyplus/cfm/training.cfm>



Ask An EnergyPlus Expert



Teaching Materials: Slab.exe

When using the slab program, as outlined in Lecture 24 of the EnergyPlus teaching materials, am I correct in thinking that I don't need to place a layer of earth in the floor construction once the ground and outside face temperatures have been determined? For past models, I have used 1m of earth as part of the floor construction though I have never been too sure that this is realistic.

Answer:

You are correct. There should be no extra layer of earth in the slab floor construction. The slab program is reporting the temperature of the ground which is in contact with the outside surface of the floor slab.



Ask An EnergyPlus Expert



Daylighting

I am running an EnergyPlus Model against a validated DOE-2.1E model. For the daylight component of the simulation, I have hourly illuminance values for EnergyPlus that are four to ten times greater than what I am seeing with DOE-2.1E. Can this be correct? I am using the same weather file and the same WINDOW 5.1 file for both simulations. I have checked over my input and am fairly sure that it is correct. Any suggestions?

Answer

The problem is in the DOE-2 input. The DOE-2 and EnergyPlus daylighting reference points appear to be in the same place at first glance. In both programs they are relative to the zone origin and the values are equivalent in the two input files. However, the DOE-2 input has zone origins of 0,0,0 and the EnergyPlus input does not. It is a very subtle difference between the two runs -- it took two sets of eyes to find the problem at this end.

Since your DOE-2 file is essentially set up in global coordinates (with all zone origins at 0,0,0), you will need to reposition the lighting reference points in DOE-2 to be consistent. There is a handy drawing tool (DrawBDL at www.drawbdl.com) available for DOE-2 which shows the daylighting reference points and revealed the problem.

Here's another option. In EnergyPlus, the daylighting reference points are shown in the DXF drawing file. To create this file, add "REPORT,Surfaces,DXF;" to your IDF file. If you do not have software which will view a DXF format drawing file, VoloView Express is available for free at

<http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=2753004>

For an example, see ExampleFiles\DaylightingDeviceTubular.idf. It uses two reference points in each daylighting zone. The first reference point is shown as a red circle, the second as a blue circle.

Reporting Sensible Heating and Cooling Loads

I have built a simulation and when I run it I get both zone sensible heating and cooling rates during the same hours. I am using NormalDamperHeatingAction, but when I look at my zone output, I have mass flow rates above the minimum specified fraction. I then look at my "Total water heating coil rate" and find that I am still transferring heat into the air stream, which seems very odd. Has anyone run into to similar problems, and is there a remedy? Thanks.

Answer

If you are reporting hourly, you are getting an average result over several HVAC time steps. If you report results at the "detailed" frequency, so that you can see data for every HVAC time step, then this may help explain what is happening.



Ask An EnergyPlus Expert



Canadian Weather Files (CWEK)

Does anyone know of a source of free TMY2 weather files for Canadian locations?

Answer

The Canadian equivalent to TMY2 is called CWEK (Canadian Weather for Energy Calculations) and is in WYEC2 format. Hourly files for 55 locations are available from U. S. National Climatic Data Center (<http://www.ncdc.gov/> or <http://www.fedworld.gov/>) or the Information Archive at Environment Canada (<http://www.ec.gc.ca/>). We heard through the "grapevine" that the Environment Canada website is being revamped and the weather files may not be easy to find. Until the website is finalized, you may direct questions to climate.services@ec.gc.ca.

The Quick Fix

If you download and install EE4 (<http://www.ee4.com/>) you get 44 CWEK files in a spreadsheet with the city for each weather file name.

Error in the ACH Calculation

When I used COMIS and obtained the infiltration volume (m^3) and ACH for each zone, I checked to see if the ACH was the same as dividing the volume output by each zone's volume. My output time step is in hours so I figured that the volume output represented all the exterior air that had entered the zone during that hour. What I discovered was that my own calculated ACH was exactly six times smaller than EnergyPlus's ACH. I figured it had something to do with my HVAC time steps per hour being six. Is there an error with Energy Plus's ACH or am I going about this the wrong way.

Answer

You are right; there is a bug in EnergyPlus. The time step values of "Infiltration-Air Change Rate" are OK. However, for hourly reporting, the sum of the time step values is being used instead of the average. We have fixed this and thank you for finding the problem!

Radiator Simulation

I am trying to simulate a building with a boiler that serves three zones heated with water radiators made of aluminum. I am using the "LOW TEMPERATURE RADIANT SYSTEM:HYDRONIC" component. To do this I have to calculate a fictitious hydronic tubing length that produces energy and power similar to that of the real radiators. Is this correct or is there another way to simulate such a plant?

Answer

The component "LOW TEMPERATURE RADIANT SYSTEM:HYDRONIC" models hydronic tubing that is embedded in a surface, such as a heated floor slab. For radiators, the best available model is BASEBOARD HEATER:WATER:CONVECTIVE. This models fin-tube coils, which heat primarily by natural convection, and is currently used to model all types of free-standing or surface mounted hot water "radiators."



Ask An EnergyPlus Expert



Building Geometry Modification

We are simulating a large building with more than 900 walls and windows. If we want to make a change in the geometry of any building component, like walls or windows, we have to modify the 12 coordinates of the corresponding component every time. For example, if we want to make a change in a window, we have to define, in an IDF file, new XYZ coordinates as four points, each corresponding to the position of the component. This is a tedious process, particularly when we have a large number of windows and walls. Is there a simpler method?

Answer

You could try the IFCtoIDF translator that converts the building geometry in CAD drawings saved in IFC format into IDF format (see <http://www.eere.energy.gov/buildings/energyplus/ifc.html>). This is still a beta product, but it would allow you to draw your building and make changes in CAD and then more easily transfer these changes to EnergyPlus. You would need to do some manual editing of the IDF to change Construction types of the envelope elements. The IFCtoIDF utility is included as part of the EnergyPlus download and can be installed by checking the IFCtoIDF checkbox during installation. Note that you should then download the update of this utility from the EnergyPlus Support website at the URL below.

http://groups.yahoo.com/group/EnergyPlus_Support/files/Updates/Windows/IFCtoIDF_Update_6-10-03.zip

Daylight Savings Time

Does anyone know what actually happens when Daylight Savings Time (DST) is turned on in EnergyPlus? A simple test that compared annual runs both with and without DST showed no difference in the hourly results. I used normal EnergyPlus weather files and the object "DaylightSavingPeriod, 1st Sunday in April, Last Sunday in October." Do the output time stamps shift with DST or do they stay in Standard Time? And what happens to those messy hours at the point of change?

Answer:

When active, DST will shift all scheduled items by one hour. Reporting is always in Standard Time. We ran a quick experiment with the PurchAir example file, added the DST object and ran from April 15 to May 15. What we found is that the DST is not active unless the RUN PERIOD field for DST says "Yes."

```
RunPeriod,
4,    !- Begin Month
15,   !- Begin Day Of Month
5,    !- End Month
15,   !- End Day Of Month
UseWeatherFile, !- Day Of Week For Start Day
Yes,  !- Use WeatherFile Holidays/Special Days
Yes,  !- Use WeatherFile DaylightSavingPeriod <-- MUST BE YES
No,   !- Apply Weekend Holiday Rule
Yes,  !- Use WeatherFile Rain Indicators
Yes;  !- Use WeatherFile Snow Indicators
```



Ask An EnergyPlus Expert



DWG / IFC / IDF

I have the latest version of Architectural DeskTop 3.3 (ADT), which supports IFC. BPro COM-Server is installed and authorized correctly, too. I created a 3-D CAD file and did an IFC export. It gave me an error message but created an IFC file and then ran the IFCToIDF utility; it created the IDF file too.

Then, on running the simulation from the EnergyPlus launch it terminated. The errors quoted were:

```
** Severe  ** No items found for Required Object=ZONE
** Warning ** Note -- Some missing fields have been filled with defaults.
               See the audit output file for details.
** Severe  ** Other miscellaneous errors found in input
** Fatal   ** Out of "range" values and/or blank required fields.
*****
EnergyPlus Terminated--Fatal Error Detected. 1
Warning; 2 Severe Errors
```

Is there a specific way to build an AutoCAD model in order for it to export correctly as an IFC? And can I take a regular DWG file of a building and export it?

Answer

There are two questions to be answered here.

1. An update to the IFCToIDF utility is available on the EnergyPlus Support site at http://groups.yahoo.com/group/EnergyPlus_Support/ under Files/Updates. This update is intended to address the problems with Spaces/Zones in ADT.
2. The problem with opening a DWG and trying to export it to IFC is that the DWG may not contain the object-based representation of entities like Walls, Windows, etc. that is necessary for mapping to the IFC data model. The drawing must be created in ADT.

Surface Geometry and Dimensions

When inputting surface geometry, should we refer to dimensions from axis to axis or should we refer to the dimensions of the inner surface of the construction element? We have noticed that zone volume is calculated as if the inputted dimensions are those of the inner surfaces; how, then, are differences in thickness of the envelope's construction elements handled?

Answer

The choice of interior, exterior, or center-line (axis) for surface dimensions is up to the user. For most wall constructions, the slight change in zone volume or wall surface areas will have very little impact on the results. Use whatever dimension is most conveniently available from the building plans. For very thick walls, center-line (axis) dimensions should probably be used to avoid overestimating the heat transfer through exterior walls. Differences in the thickness of construction elements is only used to determine the heat transfer characteristics of the surface. For shadowing and other geometric calculations, all surfaces are planes with no thickness.

EnergyPlus Version 1.1.1

To download a free copy of the program go to
www.energyplus.gov



EnergyPlus Support Tools

Support software is listed on our website (http://SimulationResearch.lbl.gov/EP/ep_tools.html) and in Section 2 of this newsletter.

EnergyPlus Weather Data from www.energyplus.gov/

There are 275 locations in the United States, 16 California thermal zones, 55 Canadian locations, and 233 international locations in more than 80 countries.

Ask an EnergyPlus Expert

Questions from EnergyPlus users are answered promptly via email by program developers. To submit questions, join the EnergyPlus User Group at http://groups.yahoo.com/group/EnergyPlus_Support/. A selection of questions/answers are compiled (yearly) into a downloadable PDF document: http://SimulationResearch.lbl.gov/dirpubs/un_articleEP02.pdf.

Are you an EnergyPlus Consultant ?

If you are engaged in EnergyPlus consulting, and would like to be listed in the *Building Energy Simulation User News* and on our website (<http://SimulationResearch.lbl.gov>), please send email to klellington@lbl.gov.

Join the EnergyPlus User Group

The developers of EnergyPlus have formed a support group to foster discussion and maintain an archive of information for program Users. We invite questions about program usage and suggestions for improvement to the code. Go to http://groups.yahoo.com/group/EnergyPlus_Support/

Translate EnergyPlus Web Pages

A new link on the main EnergyPlus web page (www.energyplus.gov/) allows you to view the pages in any of eight languages. Unfortunately, the translator doesn't work with PDF files. Look for the fish at the bottom of the web page. Pages may be translated into Chinese, French, German, Italian, Japanese, Korean, Portuguese and Spanish.

EnergyPlus is being developed by University of Illinois and Lawrence Berkeley National Laboratory, with the assistance of DHL Consulting, C. O. Pedersen Associates, Florida Solar Energy Center, GARD Analytics, the National Renewable Energy Laboratory, Oklahoma State University and others. Development of EnergyPlus is supported by the U. S. Department of Energy, Assistant Secretary for Energy Efficiency and Renewable Energy, Office of Building Technologies Program (Program Manager, Dru Crawley).

Recent Reports

This report is available from the Simulation Research Group at Lawrence Berkeley National Laboratory. You may download the pdf document from http://SimulationResearch.lbl.gov/dirpubs/ibp_spark03.pdf

Proceedings, Eighth International IBPSA Conference, Eindhoven, Netherlands August 11-14, 2003

APPLICATION OF THE SPARK KERNEL

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ABSTRACT

In the mid 1980s the monolithic nature of building energy simulation programs led to proposals for development of so-called "kernel systems," i.e., software environments that would make available to developers basic software modules and a supporting framework that could be used to construct new building simulation software. One of the outcomes of the ensuing work was the Simulation Problem Analysis and Research Kernel (SPARK). Although the current SPARK release can be viewed as a limited realization of the kernel idea, it falls short in that the internal methods can only be accessed within the context of a SPARK executive. This paper discusses two new ways in which the SPARK internal methods can be employed by model developers, leading to a fuller realization of the kernel system idea. First, a new facility called *SPARK Model Functions* is described that allows the SPARK internal methods to be used to create subsystem models of arbitrary size and complexity that can be called by foreign executive programs. Second, a new feature called *Multivalued Objects* allows easy and efficient integration of legacy models written in procedural languages into SPARK models. Together, these new features provide an Application Programmer's Interface (API) that better exposes "the K in SPARK" to the software developer.



SPARK is an equation-based simulation environment that allows you to build customized models of complex physical processes by connecting calculation objects that represent system components like walls, fans, heat exchangers, chillers, ducts, mixing boxes, controls, etc. It is aimed at the simulation of innovative and/or complex building systems that are beyond the scope of whole-building programs like DOE-2 and EnergyPlus. VisualSPARK adds a graphical user interface to SPARK to simplify its use.

Download VisualSPARK free of charge from

<http://SimulationResearch.lbl.gov> > [visualspark/](http://SimulationResearch.lbl.gov/visualspark/)

Please go to our website to download this new VisualSPARK documentation:

- **New Features, Bug Fixes, and Changes**
- **Frequently Asked Questions**
- **How To Port Atomic Classes To SPARK 2.x**
- **Theoretical Speed-Up Using SPARK**

SPARK was developed by the Simulation Research Group at Lawrence Berkeley National Laboratory and by Ayres Sowell Associates, with Support from the Assistant Secretary for Energy Efficiency and Renewable Energy, Office of Building Technologies Program of the U.S. Department of Energy, Program Manager Dru Crawley.

GenOpt 2.0 β

Generic Optimization Program

GenOpt is an optimization program for the minimization of a cost function, such as annual energy use, that is evaluated by an external simulation program.

GenOpt can be used with any simulation program -- such as EnergyPlus, SPARK or DOE-2 -- that has text-based input and output. It also offers an interface for adding custom optimization algorithms to its library.

New GenOpt Technical Reports

- [Generalized Pattern Search Algorithms with Adaptive Precision Function Evaluations](#) by Elijah Polak and Michael Wetter (click on the title to download the document)
- [Comparison Of A Generalized Pattern Search and a Genetic Algorithm Optimization Method](#), by Michael Wetter and Jonathan Wright (click on the title to download the document)
- [A Convergent Optimization Method Using Pattern Search Algorithms with Adaptive Precision Simulation](#), by Michael Wetter and Elijah Polak (click on the title to download the document)

All reports and GenOpt documentation are available free of charge from <http://SimulationResearch.lbl.gov/>

New features of Version 2.0 β

Capability to Process Discrete Independent Variables

GenOpt can now process discrete independent variables, such as different window constructions, either for optimization problems with discrete and continuous independent variables or for doing parametric studies.

New Optimization Algorithms

The following optimization algorithms are new in **GenOpt 2.0 β** :

- **GPSCoordinateSearch** and **GPSHookeJeeves**: These algorithms are members of the family of Generalized Pattern Search (GPS) algorithms. They can be used to solve optimization problems with continuous independent variables.
- **DiscreteArmijoGradient**: An algorithm that approximates gradients by finite differences and uses the Armijo line search algorithm.
- **PSOCC**, **PSOCCMesh**, and **PSOIW**: These algorithms are members of the family of Particle Swarm Optimization algorithms (which are global heuristic optimization algorithms). They can be used to solve optimization problems with continuous and/or discrete independent variables.
- **GPSPSOCCHJ**: This is a hybrid global optimization algorithm that starts by performing a Particle Swarm Optimization for the continuous and discrete independent variables and then switches to the Hooke-Jeeves Generalized Pattern Search algorithm to refine the continuous independent variables.

Pre- and Post-Processing

Some simulation programs, such as EnergyPlus, cannot pre-process the independent variables or post-process values that are computed during the simulation. For such situations, *input function objects* and *output function objects* can now be used without having to modify **GenOpt's** source code.

GenOpt 2.0 β (with documentation) may be downloaded free of charge from

<http://SimulationResearch.lbl.gov> > **GenOpt**



DOE-2



DOE-2.1E (v. 120) 1,000-Zone version for Windows from ESTSC; other vendors of DOE-2 based programs are listed on our website: <http://SimulationResearch.lbl.gov> > DOE-2

Cost is as follows:

- \$ 300 U.S. Government, non-profit Educational
- \$ 575 U.S., Mexico, Canada
- \$ 1268 All Other Non-U.S. (except in Japan, where the price is \$1129)

DOE-2 Documentation on a CD from ESTSC - Cost US\$100

What is included on the CD?

- DOE-2 Reference Manual (Part 1)
- DOE-2 Reference Manual (Part 2)
- DOE-2 Supplement to the Reference Manual (2.1E)
- DOE-2 BDL Summary (2.1E)
- DOE-2 Engineers Manual (2.1A)

Order Software and ESTSC Documentation

Ed Kidd or Kim Buckner
NCI Information Systems, Inc.
Energy Science and Technology Software Center (ESTSC)
P.O. Box 1020
Oak Ridge, TN 37831

Phone: 865/576-1037
Fax: 865/576-6436
Email: estsc@adonis.osti.gov

Purchase DOE-2 Documentation

DOE-2 Sample Run Book (2.1E) -- The Sample Run book is the only remaining DOE-2 manual not available electronically. It must be purchased separately from NTIS; ordering information may be found at <http://SimulationResearch.lbl.gov> > DOE-2 > Documentation

Free DOE-2 Documentation (<http://SimulationResearch.lbl.gov> > DOE-2 > Documentation)

- DOE-2 Basics (2.1E)
- Update Package #1:
DOE-2.1E Basics, the Supplement and BDL Summary
- Update Package #2: (Version 107, DOE-2.1E)
BDL Summary and Supplement.

DOE-2 Basics and Update Packages 1, 2, 3 and 4 are not included on the ESTSC CD. They consist of scanned pdf files and may be downloaded from our web site. You may also request the same information on a CD by sending email to klellington@lbl.gov.

The update files need to be printed and the update pages inserted into the existing DOE-2 manuals.

DOE-2 listings are continued on the next page

New DOE-2 Consultant

Bill Talbert, M.E. (btalbert@aeieng.com) USGBC LEED Accredited Professional
Affiliated Engineers Inc., 5802 Research Park Blvd., Madison, WI. 53719, (608) 441-6677

- - Continued - -

Free DOE-2 Documentation (<http://SimulationResearch.lbl.gov> > DOE-2 > Documentation)

- Update Package #3: Appendix A of the Supplement.
- Update Package #4: (1000-zone DOE-2.1E) BDL Summary.
- DOE-2 Modeling Tips (pdf)

Note that the Update Packages are **not** cumulative and each one contains different information. You have to download all four packages to update the DOE-2 documentation completely.

DOE-2 Modeling Tips is a compilation of all the "how to" and "DOE-2 Puzzler" articles from the *Building Energy Simulation User News*.

DOE-2 Training

Private or group DOE-2 courses for beginning and advanced users: Contact Marlin Addison at (602) 968-2040, marlin.addison@doe2.com

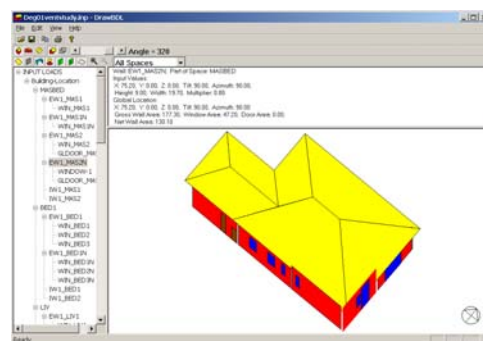
DOE-2 Help Desk

Email, phone or fax the Simulation Research Group with your questions (klellington@lbl.gov).
Phone: (510) 486-5711, Fax: (510) 486-4089

DrawBDL 3.0

Joe Huang and Associates is pleased to announce Version 3.0 of the DrawBDL program for viewing the building geometry in DOE-2 input and output files. DrawBDL has been completely rewritten using C++ to run in a native 32 bit environment such as Windows 95/2000/NT. In addition to having a new look and feel, Version 3.0 has the following improvements:

- New user interface with a hierarchical tree showing all building surfaces.
- No limit on the number of building surfaces, except for the amount of memory available on the computer.
- For building surfaces, the expanded data window shows not only the input values, but also their locations in the global coordinate system; for spaces, the data window shows the gross and net areas of walls, windows, doors, roofs, and skylights.
- Displays surfaces input as 2-D or 3-D polygons (please see DOE-2.1E Documentation Update #2 http://SimulationResearch.lbl.gov/dirsoft/21e_update2.pdf for the syntax to input surfaces as polygons).
- Changing the sort order of building surfaces used in the display; this allows users to "touch up" the shaded drawings for use in presentations.
- Output the surface data in EnergyPlus *.idf format. This is helpful for DrawBDL users who wish to convert their DOE-2 input files into EnergyPlus input files. Since DrawBDL reads and stores only building surface data, the converted EnergyPlus file is a partial file containing only the inputs for building surfaces.

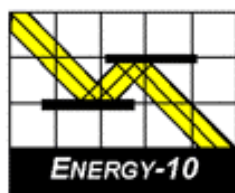


DrawBDL 3.0

DrawBDL 3.0 costs \$125 plus shipping (same price as the older version); for more information or to order, please contact →

Joe Huang and Associates
31 Sarah Lane
Moraga CA 94556-2563

Phone 925-247-9180
joe@drawbdl.com



ENERGY-10, VERSION 1.6

ENERGY-10 is a design tool for smaller residential or commercial buildings that are less than 10,000 ft² or buildings that can be treated as 1- or 2-zone increments. It performs whole-building energy analysis for 8760 hours/year, including dynamic thermal and daylighting calculations. **ENERGY-10** was specifically designed to facilitate the evaluation of energy-efficient building features in the very early stages of the design process.

Version 1.6 Upgrades

Synchronize Libraries

Libraries may now be associated with more than one building.

Free Run Mode

Automated process of monitoring how a building operates without any HVAC system.

Clear All Internal Gains

The name is self-explanatory.

New Buttons on Provisional Data Dialog Box

Users may specify whether they want autobuild HVAC sizing to be computed with or without daylighting.

Performance Summary Reports

Three performance summary reports have been added. One is a simple performance summary, which breaks down the standard summary into more readable chunks and adds a column that reflects the percentage change of going from Building 1 to Building 2. The other two are daylighting reports that show the standard daylighting factor calculated for each lighting zone.

New Defaults Library

A new set of libraries contains all the standard libraries such as floorlib, rooflib, etc. with updated values.

Registry Path for ENERGY-10 Data

New registry path allows users to maintain separate copies of the three most recent versions of **ENERGY-10**. In addition, the installation script allows installation for either "all users" or the "current user only."

Additional Tutorials on Installation CD

Three new tutorials are included in the slide show section of the installation CD, including Economics, Daylighting, and Using **ENERGY-10** in the Design Process.

Douglas K. Schroeder
1331 H Street N.W., #1000
Washington, DC 20004

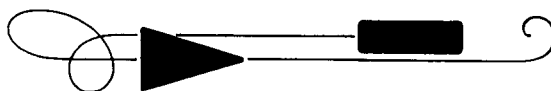


Tel: 202.628.7400 ext 210
Fax: 202.383.5043
www.sbicouncil.org

Sustainable Buildings Industry Council (SBIC)

ENERGY-10 User Group www.sbicouncil.org/forum

SBIC Bookstore www.sbicouncil.org/store/resources.php - pubs



Eley Associates Merges With Architectural Energy Corporation

Eley Associates is pleased to announce a merger with Architectural Energy Corporation (AEC) of Boulder, Colorado. The merger will become effective February 1, 2004.

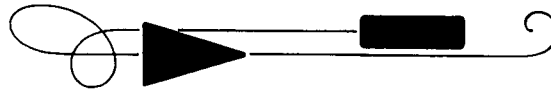
Eley Associates will remain in San Francisco and will continue to offer its clients the highest quality professional services and products, but with a larger staff and expanded set of services such as commissioning and data acquisition. AEC will have a California base for its operations.



Architectural Energy Corporation is a nationally recognized leader in energy and sustainable design and analysis, building commissioning, energy research, and data acquisition and energy analysis software. More information is available at their website at www.archenergy.com.

The new principals in AEC will be Michael J. Holtz, AIA; Donald J. Frey, PE, Charles Eley, FAIA, PE, and Erik Kolderup, PE.

The merged companies, with offices in Boulder, San Francisco, and Chicago, will operate under the name **Architectural Energy Corporation**.



A New Look for the NFRC Window Label

Since its inception in 1989, the National Fenestration Rating Council (NFRC) has developed industry standards and administered a program that has provided labels to communicate energy ratings for millions of windows, doors, skylights and curtain wall systems. NFRC is the organization recognized by the U.S. Department of Energy for determining the energy performance ratings of fenestration products.

|  World's Best Window Co. Millennium 2000+ Vinyl-Clad Wood Frame Double Glazing • Argon Fill • Low E Product Type: Vertical Slider | |
|---|--|
| ENERGY PERFORMANCE RATINGS | |
| U-Factor (U.S./I-P) 0.35 | Solar Heat Gain Coefficient 0.32 |
| ADDITIONAL PERFORMANCE RATINGS | |
| Visible Transmittance 0.51 | Air Leakage (U.S./I-P) 0.2 |
| <small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. Consult manufacturer's literature for other product performance information. www.nfrc.org</small> | |

Sample of the new NFRC Label

The fenestration industry has embraced new technology (glass coatings, gas fills, warm-edge spacers, thermally improved materials, etc.) to evaluate new products and materials. The cornerstone for communicating the performance of windows, and these advances in technology, remains the use of the NFRC label.

Changes to the NFRC Label

NFRC ratings are based on specific product sizes, depending upon the product type and operator (a swinging patio door vs. a casement window, for example). Product ratings for specific sizes were developed to allow for a side-by-side comparison of similar products in the marketplace; and for a simple method to determine code compliance. In 2002, NFRC approved a new label design. The new label will greatly assist code officials and energy service providers with a tool for determining compliance with code or program requirements.

From issue #71 of the [blueprint](#), newsletter of the California Energy Commission

BLASTnews

www.bso.uiuc.edu

Building Systems Laboratory
University of Illinois, 30 Mechanical Engineering Building,
1206 West Green Street, Urbana, IL 61801
Tel: (217) 333-3977 - Fax: (217) 244-6534
support@blast.bso.uiuc.edu

The **Building Loads Analysis and System Thermodynamics (BLAST)** program predicts energy consumption, energy system performance and cost for new or existing (pre-retrofit) buildings.

BLAST contains three major sub-programs:

- **Space Load Prediction** computes hourly space loads in a building based on weather data and user inputs detailing the building construction and operation.
- **Air Distribution System Simulation** uses the computed space loads, weather data, and user inputs.
- **Central Plant Simulation** computes monthly and annual fuel and electrical power consumption.

Heat Balance Loads Calculator (HBLC)

The BLAST graphical interface (HBLC) is a Windows-based interactive program for producing

BLAST input files. You can download a demo version of HBLC (for MS Windows) from the BLAST web site (User manual included).

HBLC/BLAST Training Courses

Experience with the HBLC and the BLAST family of programs has shown that new users can benefit from a session of structured training with the software. The Building Systems Laboratory offers such training courses on an as needed basis typically at our offices in Urbana, Illinois.

WINLCCID 98

LCCID (Life Cycle Cost in Design) was developed to perform Life Cycle Cost Analyses (LCCA) for the Department of Defense and their contractors.

To order BLAST-related products, contact the Building Systems Laboratory at the address above.

| Program Name | Order Number | Price |
|--|--------------|--------|
| PC BLAST Includes: BLAST, HBLC, BTEXT, WIFE, CHILLER, Report Writer, Report Writer File Generator, Comfort Report program, Weather File Reporting Program, Control Profile Macros for Lotus or Symphony, and the Design Week Program. The package is on a single CD-ROM and includes soft copies of the BLAST Manual, 65 technical articles and theses related to BLAST, nearly 400 processed weather files with a browsing engine, and complete source code for BLAST, HBLC, etc. Requires an IBM PC 486/Pentium II or compatible running MS Windows 95/98/NT. | 3B486E3-0898 | \$1500 |
| PC BLAST Package Upgrade from level 295+ | 4B486E3-0898 | \$450 |
| WINLCCID 98: executable version for 386/486/Pentium | 3LCC3-0898 | \$295 |
| WINLCCID 98: update from WINLCCID 97 | 4LCC3-0898 | \$195 |

The last four digits of the catalog number indicate the month and year the item was released or published. This will enable you to see if you have the most recent version. All software will be shipped on 3.5" high density floppy disks unless noted otherwise.



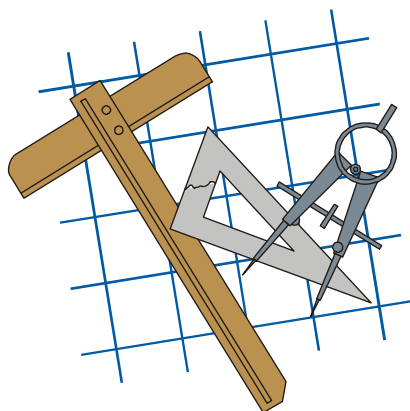
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Building Energy Software

from the Environmental Energy Technologies Division of Lawrence Berkeley Laboratory

| Free Downloads | |
|--|--|
| BDA 3.0 (Building Design Advisor) (building decision-making from design through completion) | gaia.lbl.gov/BDA |
| COMIS (multi-zone air flow and contaminant transport model) | www-epb.lbl.gov/comis |
| EnergyPlus 1.1.1 (new-generation whole-building energy analysis program, based on BLAST and DOE-2) | http://www.energyplus.gov/ --or-- SimulationResearch.lbl.gov > EnergyPlus |
| GenOpt[®] 2.0β (generic optimization program) | SimulationResearch.lbl.gov > GenOpt |
| Optics 5.1.02 (for analyzing optical properties of glazing systems) | windows.lbl.gov/materials/optics5/ |
| RADIANCE 3.5 (analysis and visualization of lighting in design) Desktop Radiance 2.0β (integrates the Radiance Synthetic Imaging System with AutoCAD Release 14) Radiance Control Panel (automates some Radiance tasks once the model has been created) | radsite.lbl.gov/radiance/ radsite.lbl.gov/deskrad/ www.squ1.com/site.html |
| RESEM (Retrofit Energy Savings Estimation Model) (calculates long-term energy savings directly from actual utility data) | eetd.lbl.gov/btp/resem.htm |
| SUPERLITE (calculates illuminance distribution for room geometries) | eetd.lbl.gov/btp/superlite2.html |
| THERM 5.2 (models two-dimensional heat-transfer effects in building components where thermal bridges are of concern) | windows.lbl.gov/software/therm/therm.html |
| VisualSPARK 2.0 (Simulation Problem Analysis and Research Kernel) (connect component models to simulate innovative building envelope and HVAC systems) | SimulationResearch.lbl.gov > VisualSPARK |
| WINDOW 5.2 (thermal analysis of window products) | windows.lbl.gov/software/window/window.html |
| Free Software / Request by Fax from 510.486.4089 | |
| RESFEN 3.1 (choose energy-efficient, cost-effective windows for a given residential application) | windows.lbl.gov/software/resfen/resfen.html |
| Web Based (free) | |
| Home Energy Saver (quickly computes home energy use) and Home Improvement Tool (simplified Home Energy Saver) | hes.lbl.gov and hit.lbl.gov |





Building Energy Tools Directory

The web-based Building Energy Tools Directory contains information on more than 270 building-related software tools from around the world.

For each tool in the directory, a short description is provided, along with information about technical expertise required, users, audience, input, output, validation, computer platforms, programming language, strengths, weaknesses, technical contact, availability and cost. A link is also provided for directly translating the web pages into more than eight languages.

Know of a tool (yours?) that isn't in the directory? Visit http://www.eere.energy.gov/buildings/tools_directory/your_software_here.html or contact Dru Crawley at Drury.Crawley@ee.doe.gov.

The Forecast Looks Favorable for ...

(Free!) Weather Data on Demand

You can access archived weather data from around the world through this U.S. DOE web interface:



www.eere.energy.gov/buildings/energyplus/cfm/weatherdata/weather_request.cfm

Hourly weather data is continuously collected and stored into a local database, available through this web interface. Most stations have information for dry bulb temperature, wet bulb temperature, wind speed/direction, atmospheric pressure, visibility, cloud conditions, and precipitation type.

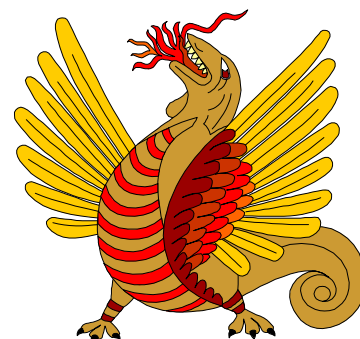
JOIN THE BLDG-SIM MAILING LIST

BLDG-SIM is a mailing list for users of building energy simulation programs like EnergyPlus, DOE-2, Trace-600, HAP, BLAST, ESP, SERIRES, TRNSYS, TASE, ENERGY-10 and others.

Because building simulation professionals are located worldwide, the BLDG-SIM list is an attempt to foster the development of a community of those users. Users of all levels of expertise are welcome and are encouraged to share their questions and insights about these programs. To subscribe, send a blank email message to BLDG-SIM-SUBSCRIBE@GARD.COM

The web page for BLDG-SIM is www.gard.com/bldg-sim.htm

Jason Glazer, P.E., of GARD Analytics, Inc., is the list administrator (jglazer@gard.com).



Run for safety, foolish pedestrians!